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HELMET FOR DIVERS, MINERS, FIREMEN, AND THE LIKE

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Fig. 1.

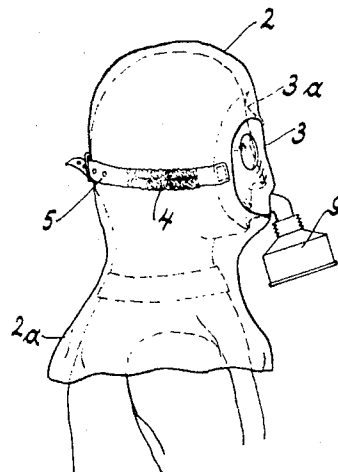
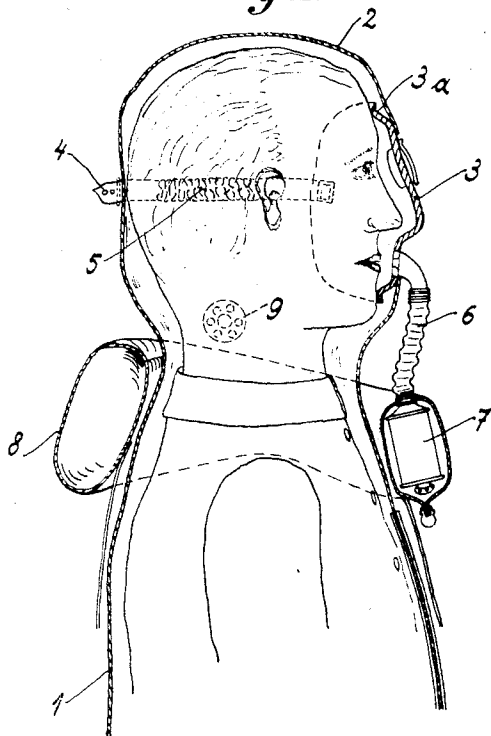


Fig. 3.

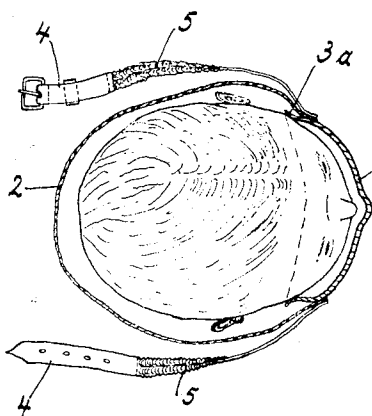


Fig. 2.

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UNITED STATES PATENT OFFICE

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HELMET FOR DIVERS, MINERS, FIREMEN,
AND THE LIKEHermann Stelzner, Lubeck, Germany, assignor
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and in Germany July 31, 1929

2 Claims. (Cl. 128—141)

The invention relates to a helmet as a part of outfits for divers, miners, firemen and the like, particularly to be used in connection with breathing apparatus operated by the power of the lungs, that is to say breathing apparatus performing its work without an injector. The helmet is distinguished by its connection with a mask, which is so yieldingly held against the face, that its rim acts like a valve between the space enclosed by the mask and the space enclosed by the helmet and prevents the difference in pressure between the two said spaces or the increase of the pressure in the space of the mask respectively from exceeding a degree that might impede breathing. The mask may be provided with an elastic border acting like a valve flap and/or with an elastic draw-band. Preferably a helmet is used, which in known manner is made of a yielding material in which case the elastic bands according to the invention are passed round the back head outside the helmet. Such helmet enables an undisturbed diving in various depths of water and has also advantages when used in an atmosphere of irrespirable gases.

In the drawing a helmet is shown by way of example to illustrate the invention.

Fig. 1 is a vertical section of a helmet made in one with a diver's suit, combined with a lung-power breathing device provided with a cartridge adapted to give off oxygen chemically on breathing.

Fig. 2 is a horizontal section of the helmet the holding bands being loosened, and

Fig. 3 is an elevation of the helmet connected with a filter breathing device for breathing-in irrespirable gases drawn to a smaller scale.

In the construction shown in Fig. 1 the suit 1 and the helmet 2 are made of the same pliable material, the suit proper being laced or provided with a so-called lightning fastener of the hookless type to enable the suit to be put on. The mask 3 is set in a front opening of the helmet 2 in an air-tight manner or made integral therewith. The border or edge 3a contacting with the face being elastic and made of rubber or similar material the edge or border 3a is pressed against the face by the aid of the head bands 4, which are either inelastic or are provided with a yielding or elastic portion 5, and which engage the mask 3 or the rim of the helmet near the mask, and are led round the back head in the height of the ears. The hose 6 branches off from the mask 3 and serves to connect the mask with a cartridge 7 filled with a substance containing superoxide, that is to say chemicals

which give off oxygen, owing to the breathing operation. This lung power breathing device is moreover provided with a breathing sack 8 placed around the shoulders and adapted to act like a floatable ring or life-belt. A breathing valve 9 is mounted on the helmet.

In divers' suits the helmet must be filled with air when diving, because otherwise, though slight but in time unbearable differences in pressure will arise which are particularly inconvenient to the ear. The buoyancy of the helmet, however, should be as small as possible, to avoid the use of special loading weights. For this reason the pliable head part must be drawn together by the ribbons or bands 4. Since these, however, are yielding owing to the springs or elastic portions 5 in the first instance air when tensioned to a certain extent will urge its way past the place where the bands exert a pressure and in the second instance the elastic effect of the border 3a of the mask is not reduced but increased.

In diving the air within the helmet is compressed to the pressure of the water, thus the space within the helmet to a certain extent vanishes, and the material of the helmet approaches the head in folds. When the diver still drops down to a greater depth the pressure in the breathing sack 8 preponderates, and air will pass from the space of the mask into the space of the helmet, whereby the elastic tightening border 3a opens like the flap of a valve. On rising to the top or on emerging out of the water the air in the helmet expands into lower parts of the suit. Under some circumstances it may be desirable to make the border 3a semi-stiff and to use the elasticity of the bands 4 alone for the valve-like effect of the tightening rim. The bands also may be inelastic and the tightening rim may then be of greater elasticity.

The construction shown in Fig. 3 differs from that shown in Figs. 1 and 2 only inasmuch as the helmet is not connected with a suit, but is only provided with a prolongation 2a reaching over the shoulders and moreover the mask 3 is shown to be connected with a filter-breathing device 9. In this case the hood essentially has the object to serve as a protection against jets of gas or of a gas-flame. The special connection of the hood with the mask 3 in this case has the object of avoiding certain drawbacks which arise when the mask for itself will not snugly fit all round, when the face differs to a great extent from the normal shape, for instance when the face is very small. Owing to the valve-like effect of the mask-edge or border a combined hood and

mask of this kind can be well used for many various shapes, or faces of men, women and children, because even when the edge of the mask does not exactly fit the elastic mask border 5 3^a will bear against the face similar to the flap of a valve on inhaling that is to say when a lower pressure arises within the mask. On exhaling, it is true, the mask edge-valve will open somewhat so that exhaled air partly may escape 10 under the hood ribbon.

I claim:—

1. A helmet for use in diving suits, gas masks, and the like, comprising a head piece, a piece of material inserted in the head piece having an 15 elastic edge portion contacting with the face of the wearer and surrounding a respiratory organ, said piece of material dividing the interior of the helmet into an inner space and an outer space when the helmet is worn, the edge portion of the 20 piece being outwardly and upwardly curved to act as valving means which may be opened by an increased pressure within the inner space, said valving means being adapted to function when the pressure within the inner space is very 25 slightly increased, elastic attachment bands for securely pressing said outwardly curved edge portion against the face of the wearer, means for connecting said inner space with a breathing

supply, and means for permitting the exhaust of air from the said outer space.

2. A helmet for use in diving suits, gas masks, and the like, comprising a head piece, a piece of material inserted in said head piece having an 80 elastic edge portion contacting with the face of the wearer and surrounding a respiratory organ, said elastic edge portion being outwardly and upwardly curved, said piece of material dividing 85 the interior of the helmet into an inner space and an outer space when the helmet is worn, said elastic edge portion of said piece of material being adapted to act as valving means which may be opened by an increased pressure within 90 the inner space, said valving means being adapted to function when the pressure within the inner space is very slightly increased, elastic attachment bands for securely pressing said edge portions against the face of the wearer, said at- 95 tachment bands being secured to the head piece at points adjacent the points where said head piece and said inserted piece of material are secured together, means for connecting the inner space with a breathing supply, and means through which the air may be exhausted from 100 said outer space.

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